Diagenetic coatings on *G. ruber* control Caribbean U/Ca records during wet interstadials

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Results from laboratory culture experiments have shown that U/Ca ratios of pristine planktic foraminifera are inversely related to seawater carbonate concentration and pH, suggesting that U/Ca may be useful as a proxy for paleo-pH. However, the amplitude and frequency of calculated pH based on U/Ca ratios in *G. ruber* from western Caribbean core ODP999A over the last glacial cycle are significantly greater than published δ^{11}B-pH from the same core, and pCO_2 calculated from U/Ca-pH is unrealistically high during interglacials (compared to ice-core pCO_2).

Here we compare the ODP999A *G. ruber* U/Ca and Mn/Ca records with published bulk sediment Fe/Al and salinity reconstructions from δ^{18}O and Mg/Ca. During cold, dry glacial periods, Fe/Al increases due to enhanced delivery of Fe-oxide-rich sediments from Colombian lowlands. During wet interglacials, surface-water salinity decreases, resulting in greater water-column stratification. We hypothesize that U-rich authigenic coatings form during wet interglacial periods as adsorbed U is released from Fe- and Mn-oxides under reducing conditions, forming authigenic carbonate overgrowths. The glacial-interglacial cyclicity observed in the ODP999A U/Ca record is produced by variations in the supply of terrigenous Fe-Mn oxides to the Colombia Basin, combined with changes in degree of bottom-water oxygenation due to variable relative contributions of oxic North Atlantic versus lower-O_2 Antarctic Intermediate Waters.